

REMARKS

Favorable reconsideration of all pending claims are respectfully requested for the reasons indicated in detail below. These claims are believed to define patentable subject matter.

Claims 1-16 have been canceled.

Claims 7 and 8 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Since claims 7 and 8 have been canceled, this rejection is now considered to be moot.

Claims 1-16 stand rejected under 35 U.S.C. 102(b) as being anticipated by Kocal (US 6277271). Since claims 1-16 have been canceled, this rejection is also considered to be moot.

Claim 16 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Kocal in view of Savage (US 5454933). Since claim 16 has been canceled, this rejection is considered to be moot.

Claims 17-23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kocal in view of Savage.

By way of review, the present invention is a process for the desulfurization of a hydrocarbonaceous oil feedstock wherein the hydrocarbonaceous oil is desulfurized in a hydrodesulfurization reaction zone to produce hydrogen sulfide and a resulting first hydrocarbonaceous oil stream having a reduced concentration of sulfur. The first hydrocarbonaceous oil stream having a reduced concentration of sulfur is contacted with an aqueous oxidizing solution in an oxidizing zone to produce a second hydrocarbonaceous oil stream comprising sulfur-oxidated compounds. The second hydrocarbonaceous stream comprising sulfur-oxidated compounds is contacted with a selective adsorbent having a greater selectivity for the sulfur-oxidated compounds than for sulfur-free hydrocarbonaceous oil to produce an adsorbent containing at least a portion of the sulfur-oxidated

of the sulfur-oxidated compounds and a third hydrocarbonaceous stream having a reduced concentration of sulfur-oxidated compounds. The resultant adsorbent containing sulfur-oxidated compounds is regenerated and re-used for subsequent adsorption of sulfur-oxidated compounds. A resulting hydrocarbonaceous oil stream having a reduced concentration of sulfur is thereby recovered.

The Examiner states that Kocal does not disclose regenerating at least a portion of the adsorbent and recycling the regenerated adsorbent to the adsorption zone to provide at least a portion of the selective adsorbent.

The Kocal reference discloses a process for the desulfurization of a hydrocarbonaceous oil by separating sulfur-oxidated compounds from a hydrocarbon oil by the use of adsorption. The Kocal reference fails to disclose that spent adsorbent containing sulfur-oxidated compounds is regenerated and subsequently returned to adsorbent service.

The Savage reference discloses a process for removing sulfur from a distillate hydrocarbon stream wherein a feedstock containing sulfur compounds is hydrotreated in a conventional hydrotreating zone and the hydrotreated distillate stream is passed to an adsorption zone containing a solid adsorbent which adsorbs substituted dibenzothiophene aromatic sulfur compounds with an activated carbon adsorbent. The spent adsorbent is regenerated by removing substituted dibenzothiophene sulfur compounds from the desorbent in order to recycle the regenerated desorbent stream back to the adsorption zone. The Savage reference fails to teach that the adsorbent is used to separate sulfur-oxidated compounds from a hydrocarbon stream which had been previously hydrotreated.

The Examiner is reminded that an invention is patentable unless the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made. The Examiner states that it would be obvious to modify the process of the Kocal reference by the use of the teachings of the Savage

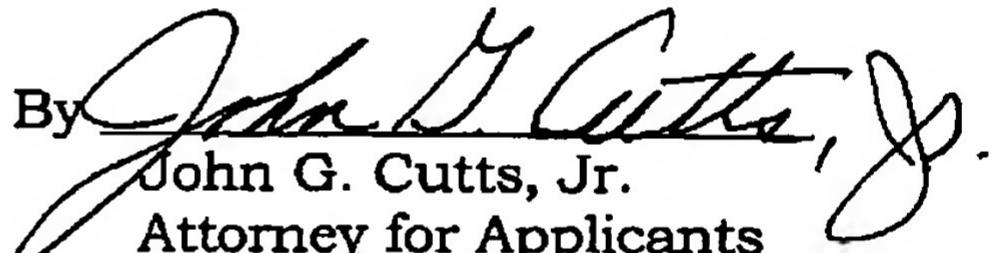
Savage reference to arrive at the process of the present invention. The Examiner is reminded that the process of the present invention utilizes a separation step wherein an adsorbent is used to remove sulfur-oxidated compounds from a hydrocarbonaceous stream and to subsequently regenerate the adsorbent by removing sulfur-oxidated compounds from the spent adsorbent. The Savage reference only discloses the adsorption of substituted dibenzothiophene sulfur compounds and not sulfur-oxidated compounds. Only the applicants have disclosed that an adsorbent is useful for removing sulfur-oxidated compounds from a hydrocarbon stream and to successfully regenerate spent adsorbent thereby providing a stream of regenerated adsorbent recycle. The applicants respectfully submit that a person skilled in the art would have no incentive to modify the Kocal reference with the Savage reference to arrive at the process of the present invention.

The fact that individual components can be found in the prior art and rearranged to provide the benefits of a novel integrated process for the desulfurization of a hydrocarbonaceous feedstock is not a proper basis for an obviousness rejection. There must be something more in the art to suggest a modification of the cited reference than obtaining the benefit that the applicants have discovered. One of ordinary skill in the art would not know the advantages which have been discovered by the applicants and described in the specification of the present application. The mere application of broad principles or goals is insufficient to provide the missing motivation or suggestion to the *prima facie* case. The use of scientific principle alone has been specifically rejected as sufficient to support a *prima facie* case of obviousness where the prior art does not suggest desirability of the modification. Moreover, widely known and simple components when integrated into a beneficial invention are not obvious despite the means with which the components may have been integrated if one skilled in the art recognized the benefit of the integrations.

Based upon the hereinabove discussion, the applicants respectfully submit that the rejection of claims 17-23 is not supported by a *prima facie* case of obviousness and should be withdrawn in view of the degree of disassembly and altered reconstruction of the prior art required to construct the applicants' invention. The applicants respectfully submit that the Examiner has cited no prior art references, either alone or in combination, which disclose, teach or suggest the essential features of the present invention.

In view of the hereinabove discussion, it is respectfully submitted that all of the pending claims are allowable over 35 U.S.C. 103 and that the application is in condition for allowance. Favorable reconsideration and allowance of the pending claims are therefore courteously solicited.

Respectfully submitted,  
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JGC:sb

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Page 8